



A STUDY ON THE RELATIONSHIP BETWEEN SCIENTIFIC ATTITUDE AND ACHIEVEMENT IN PHYSICS OF SECONDARY SCHOOL STUDENTS

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ABSTRACT

Science teaching helps students to explore their world and discover new things. Science, being an ideal subject makes students to become curious and helps in developing scientific attitude. Scientific attitudes refer to the behavioral dispositions expected in individuals who intend to become successful scientists. Scientific attitudes include respect for evidence, honesty, creativity, flexibility, curiosity, objectivity and skepticism. Achievement in science subjects needs a positive attitude from the part of students. In this paper, the investigator tried to find out whether there exists any relationship between Scientific Attitude and Achievement in Physics of Secondary School Students for the total sample and for the subsample based on Gender. The investigator also finds out whether there exist any significant differences in the Scientific Attitude and Achievement in Physics among Secondary School Students based on Gender. Proper statistical techniques were used for collecting standardizing and analyzing the data.

1.1 Introduction

In order to make life more meaningful and to have progress in the society, inventions and discoveries are must. Scientific attitude is a logical way of thinking clearly, reasonably without any disturbance or prejudice. Science teaches us to think correctly. Scientific attitude means not accepting any fact which does not have any proof. If there is Scientific Attitude you always think and act wisely for the development of Science.

Quite often school science implies or depicts scientists as being rational and critical in their scientific activities. This, however, may not always be the case. Gauld (1973) admits that rationality does play a part in scientific activity but is not always evident and not always practiced by all the members of scientific community. Kirkut (1960) suggested that rational thinking is certainly exercised in judging the products of these with whom one disagrees although the same case may not be lavished on the arguments of scientists whose views are closer to one's own. Writings by Kuhn (1962) also provide an insight into factors and personal characteristics that influence a scientist's activity. According to Abdullahi (1982) and Babayi (2007), commented that the prestige and political power of any nation resides in its level of scientific activities. The students who have positive scientific Attitude in Science often enjoy learning of Science and its related topics. They will always show interest and curiosity for new findings in Science. Developing Scientific Attitude is one of the major aims in teaching Science. So Science teaching should always focus on developing a positive Scientific Attitude.

1.2 Need and significance of the study

Scientific Attitude is a multidimensional concept. The student's scientific attitude towards science may affect their performance. Attitude has been viewed as the predisposition to respond positively or negatively toward an object or phenomena. One of the important goals of science teaching is to promote positive scientific attitudes toward science. Students with positive feelings toward science achieve more and also more likely to incorporate science into their daily lives when they appreciate its importance (Simpson and Anderson 1981).

From the discussions, it is clear that scientific attitude is essential for learning broader concepts of science. Students having better scientific attitude will always be eager to explore new ideas of science which will ultimately lead to better achievement in content area. Here the Achievement in Physics as a science subject can be increased by developing the scientific attitude of students towards science in general and Physics in Particular. By understanding the interconnection between scientific attitude and Achievement, Teachers can adopt various strategies and techniques and gives them hands on experiences in arousing scientific attitude in students that will finally lead to the mastery of content area and better achievement.

1.3 Hypotheses of the study

- There will be significant relationship Scientific Attitude between and Achievement in Physics of secondary school students for the total sample and sub-sample based on Gender.
- There will be significant relationship in the Scientific Attitude of secondary school students based on Gender.
- There will be significant relationship in Achievement in Physics of secondary school students based on Gender.

ary school students based on Gender.

1.4 Objectives of the study

- To find out whether there exist any significant relationship between Scientific Attitude and Achievement in Physics of secondary school students for the total sample and sub-sample based on Gender.
- To find out whether there exist any significant difference between Scientific Attitude of secondary school students based on Gender.
- To find out whether there exist any significant difference between Achievement in Physics of secondary school students based on Gender

1.5 Population of the study

Secondary school students studying in the schools run by General Education Department of Government of Kerala is selected as the population of the study.

1.6 Sample selected for the study

The sample selected for the study consists of 110 secondary school students in standard VIII of various schools of Kollam District. Out of 110 samples 55 were Boys and 55 were Girls. The samples were selected by using stratified sampling Technique.

1.7 Tools used for the study

1. Scientific Attitude: A scientific attitude is a disposition to act in a certain way or a demonstration of feelings and/or thoughts. Scientific Attitude Scale is a standardized tool prepared by Dr. Sukumaran Nair and Shakunthala Devi. The Scientific Attitude Scale consists of 25 items and the reliability coefficient established is 0.86. The investigator re-established reliability through test-retest and reliability coefficient was found to be 0.88

2. Achievement in Physics: - An Achievement Test in Physics was prepared and standardized by the investigator from the selected units of standard VIII Physics text book. Weightage was given to the objectives according to the Taxonomy of Science Education formulated by Mc Cormack and Yager (1989). Items having Difficulty Index between 0.30 and 0.70 and Discriminating Power above 0.30 were taken for the final test. Thus 40 items were selected for the final test. The correlation between the first set of scores and the second set of scores is determined using Test-Retest Method and the reliability coefficient obtained was 0.82. Content validity was also established through expert's opinion.

1.8 Methodology used for the study

The investigators adopted Survey Method for collecting data of Scientific Attitude Scale. For the selected sample the investigators administered Scientific Attitude Scale and Achievement Test in Physics among secondary school students. The answer sheets were collected tabulated and analyzed using suitable statistical techniques.

1.9 Statistical Technique used

- Descriptive Statistics
- Significance of difference between Means
- Call Pearson Product Moment Correlation

2. Analysis and Interpretation

2.1 Relationship between Scientific Attitude and Achievement in Physics of secondary school students for the total sample and sub-sample based on Gender.

The investigator calculated the scores of Scientific Attitude and Achievement in Physics. The mean and standard Deviation obtained for the total sample and subsample Boys and Girls on Scientific Attitude and Achievement in Physics are given in Table 1

Table 1
Descriptive statistics for the total sample and Relevant Subsamples on Achievement in Physics and Scientific Attitude

Variables	Total Sample		Boys		Girls	
	Mean	S.D	Mean	S.D	Mean	S.D
Achievement in Physics	12.78	4.12	15.44	2.99	15.80	3.00
Scientific Attitude	106.95	17.54	102.64	17.84	111.27	16.29

Table 1 shows that the Mean scores obtained by Girls is slightly higher than that of Boys with respect to variables Scientific Attitude and Achievement in Physics. This implies that Girls have more Scientific Attitude than Boys which led to more Achievement in Physics for Girls than Boys.

The correlation between Scientific Attitude and Achievement in Physics were found out for the Total sample and Subsample Gender using Pearson Product Moment Correlation. The results are given in Table 2

Table 2
Correlation between Scientific Attitude and Achievement in Physics of secondary school students for the total sample and sub-sample based on Gender.

Variables	'r' value		
	Total Sample (N=110)	Boys (N=55)	Girls (N=55)
Achievement in Physics and Scientific Attitude	0.94**	0.96**	0.97**

**Significant at 0.01 level

Table 2 shows that the correlation coefficients obtained for the Total Sample, Boys and Girls are all positive. This reveals that there exists a significant difference positive correlation between Scientific Attitude and Achievement in Physics for the total sample and subsamples based on Gender.

2.2 Comparison of Scientific Attitude and Achievement in Physics of secondary school students based on sub-sample Gender.

The Mean and Standard Deviation were calculated for the subsamples Boys and Girls. Significance of difference between the Mean scores of Boys and Girls were found out for the variables Scientific Attitude and Achievement in Physics. The results obtained are given in Table 3.

Table 3
Comparison of boys and Girls on Scientific Attitude and Achievement in Physics

Variables	Gender	N	Mean	S.D	t-value
Achievement in Physics	Boys	55	15.44	2.99	0.64
	Girls	55	15.80	3.00	
Scientific Attitude	Boys	55	102.64	17.24	2.65
	Girls	55	111.27	16.29	

Table 3 shows that there is no significant difference between Boys and Girls on Achievement in Physics but significant difference was found in Scientific Attitude of Secondary School Students. The Mean score shows that Girls are slightly higher than that of Boys in Scientific Attitude and Achievement in Physics.

Major findings of the study

- There exists positive Correlation between Scientific Attitude and Achievement in Physics of secondary school students for the total sample and sub-sample based on Gender.
- There is significant difference in Scientific Attitude of secondary school students based on Gender.
- There is no significant difference on Achievement in Physics of secondary school students based on Gender.

Educational Implication of the study

- The variables Scientific Attitude and Achievement in Physics are positively correlated. This implies that Teaching and learning activities in Science

classrooms should focus ways of improving Scientific Attitude in the minds of students.

- Teachers should be responsible enough to integrate the Scientific Attitude in the Teaching Learning Process with the same enthusiasm given for Cognitive components.
- The Science Curriculum should be restructured by giving due importance for developing and enhancing Scientific Attitude, since it affects the study of science.
- The result shows no significant difference between Boys and Girls in Achievement in Physics. This can be taken as merit of the present system of education. Thus gender disparity does not exist for the variable - Achievement in Physics. But shows significant difference between Boys and Girls in Scientific Attitude.

Conclusion

The affective domain is often neglected because teachers have difficulty designing strategies to develop positive attitudes among students and documenting their development. But the study revealed that there is a positive relationship between Scientific Attitude and Achievement in Science. Science curriculum developers should focus on improving students' attitudes toward science and scientists. Scientific personalities were persons who possess good Scientific Attitude. Since Affective Domain can significantly enhance, inhibit or even prevent student learning, teachers have great role to increase their effectiveness by considering the affective domain especially Scientific Attitude in planning courses, delivering lectures and activities, and assessing student learning.

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